

Customer No.: 31561
Application No.: 10605,326
Docket No.: 11209-US-PA

REMARKS

Present Status of the Application

Claims 1-26 are pending of which claims 11-12 and 17-18 have been amended to correct some minor typographical errors, claims 1-10 and 14 have been canceled without prejudice or disclaimer, and new claims 20-26 have been added, to more clearly describe the present invention. Furthermore, the Title of the Invention has been amended according to the suggestion of the Examiner, and specification has also been amended to correct some minor typographical errors. It is believed that no new matter adds by way of amendments made to, title, specification and claims, or otherwise to the application. For at least the following reason, Applicants respectfully submit that claims 11-13, 15-26 patently define over prior art of record and reconsideration of this application is respectfully requested.

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Discussion of Objections to Specification

1. The Office Action objected to Title of the Invention for not being clearly descriptive of the Invention and suggested a new title of the Invention.

In response thereto, Applicants would like to thank the Examiner for pointing out the informalities and accordingly amended the Title of the Invention as suggested by the Examiner. Reconsideration is respectfully requested.

2. The Office Action objected to the specification because of some informalities in paragraphs [0028].

In response thereto, Applicants would like to thank the Examiner for pointing out the informalities, however, Applicants respectfully submit that the informalities pointed out the Examiner is actually in paragraph [0027] and not in paragraph [0028], and accordingly amended paragraph [0027] as suggested by the Examiner. Reconsideration is respectfully requested.

Discussion of Objections to Claims

The Office Action objected Claims 2-5, 9 and 11-15 because of some informalities.

In response thereto, Applicants would like to thank the Examiner for pointing out the informalities and accordingly amended claims 11-12 and 15 as suggested by the Examiner. Reconsideration is respectfully requested.

Discussion of the claim rejection under 35 USC 112

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The Office Action rejected claims 1-19 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In response thereto, Applicants would like to thank the Examiner for pointing out the informalities and accordingly canceled claims 1-10 and amended claims 11-12, 15 and 17-18 as suggested by the Examiner. Reconsideration is respectfully requested.

Discussion of the claim rejection under 35 USC 103

1. *The Office Action rejected claims 1-3, 6-7 and 9 under 35 USC 103(a) as being unpatentable over US patent No. 6,268,272 to Jang et al (hereinafter Jang) in view of US patent No. 5,817,562 to Chang et al. (hereinafter Chang).*

2. *The Office Action rejected claims 11-12 and 16-17 under 35 USC 103(a) as being unpatentable over Jang et al.*

Applicants respectfully submit that claims 1-10 have been canceled without prejudice or disclaimer.

Applicants respectfully disagree and traverse the above rejections as set forth below. Independent claim 11, as amended, is allowable for at least the reason that Jang (and Chang) fail to teach, suggest or hint every features of claim 11. More specifically, Jang (and Chang) substantially fail to teach or disclose a method of forming a contact opening comprising at least a step of "performing an ion implantation for either implanting nitrogen ions into sidewalls of the gate structures and the cap layers or implanting oxygen or argon ions into exposed substrate

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between the gate structures; and performing a thermal processing operation to form a liner layer on sidewalls of the gate structures and exposed substrate, wherein ions implanted into the sidewalls of the gate structures suppress growth of the liner layer on the sidewalls of the gate structures and the ions implanted into the exposed substrate between the gate structures enhance growth of the liner layer on the exposed substrate so that the liner layer on the sidewalls of the gate structures has a thickness smaller than the liner layer on the exposed substrate" as required by the amended claim 11. The advantage of the this process of forming the liner layer with thickness comparatively thinner on the sidewalls compared to that formed on the exposed substrate is that at least this would effectively eliminate an etching step for etching out a portion of the oxide layer on the sidewalls of the gate structures for enlarging the gap between the gate structures.

To the contrary, Jang substantially teaches that when the gate electrode comprising titanium silicide layer is subjected to re-oxidation process, the side wall of the TiSi layer (13a) is excessively oxidized resulting due to abnormal oxidation of the TiSi layer (13a) which would undesirably increase the resistivity of the gate electrode. Jang further teaches that the abnormal oxidation of the TiSi layer (13a) is influenced by mole ration x of Si to Ti (Si/Ti) in the TiSi $_x$ sputtering target for depositing TiSi $_x$ layer and that when mole ratio x of Si/Ti below about 1.8, the abnormal oxidation is extremely occurred, and when the mole ratio x of Si/Ti is above about 2.4, the abnormal oxidation is almost never occurred. In other words, in case that Si content of TiSi $_x$ sputtering target is excessive, stoichiometrically, the oxidation ratio of the

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TiSi layer (13a) is equal to that of the polysilicon layer (12) (please see col. 2, lines 1-10). Based on the above finding Jang proposes implanting Si ions into the TiSi layer (13a) to raise the Si/Ti ratio to above 2.4 so that the growth rate of the oxide layer on the TiSi layer (13a) and the polysilicon layer (12) is rendered substantially same and thereby eliminate the abnormal oxidation of the TiSi layer. In other words, it is clear that Jang substantially fails to recognize the advantage of forming thinner liner layer on the sidewalls of the gate electrodes and a comparative thicker liner layer on the exposed substrate between the gate electrodes in a single thermal oxidation step, as required by Claim 11. Accordingly, Applicants respectfully submit that Jang cannot possibly meet the claimed invention in this regard.

Thus, Jang (and Chang) fail to teach each and every features of the proposed amended independent claim 11.

Furthermore, because the newly added proposed independent Claims 20 and 24 also recites features similar to the proposed independent Claim 11, and therefore Applicants similarly submit that the proposed amended independent Claim 11 also patently define over combination of Jang and Chang for at least the same reasons discussed above.

Claims 12, 16-17, 21-23 and 25-26, which depend from Claims 11, 20 and 24, directly or indirectly, are also patentable over Jang (and Chang), at least because of their dependency from an allowable base claim.

For at least the foregoing reasons, Applicants respectfully submit that claims 11-12, 16-17 and 20-26 patently define over Jang (and Chang), and therefore should

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be allowed. Reconsideration and withdrawal of the above rejections is respectfully
requested.

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CONCLUSION

For at least the foregoing reasons, it is believed that all the pending claims 11-13 and 15-26 of the present application patently define over the prior art and are in proper condition for allowance. If the Examiner believes that a telephone conference would expedite the examination of the above-identified patent application, the Examiner is invited to call the undersigned.

Respectfully submitted

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Belinda Lee
Belinda Lee

Registration No.: 46,863

Jianq Chyun Intellectual Property Office
7th Floor-1, No. 100
Roosevelt Road, Section 2
Taipei, 100
Taiwan
Tel: 011-886-2-2369-2800
Fax: 011-886-2-2369-7233
Email: belinda@jcipgroup.com.tw
Usa@jcipgroup.com.tw